(19)日本国特許庁（ＪＰ）　(12)**公開特許公報**（Ａ）　(11)特許出願公開番号

特開平11－170474

(43)公開日　平成11年(1999)６月29日

(51)Int.Cl.[6]	識別記号	ＦＩ	
Ｂ４１Ｆ　7/02		Ｂ４１Ｆ　7/02	Ａ
13/00		13/00	Ａ
13/08		13/08	
33/00		33/00	Ｄ

審査請求　未請求　請求項の数４　ＯＬ　（全７頁）

(21)出願番号　特願平9－335589

(22)出願日　平成９年(1997)12月５日

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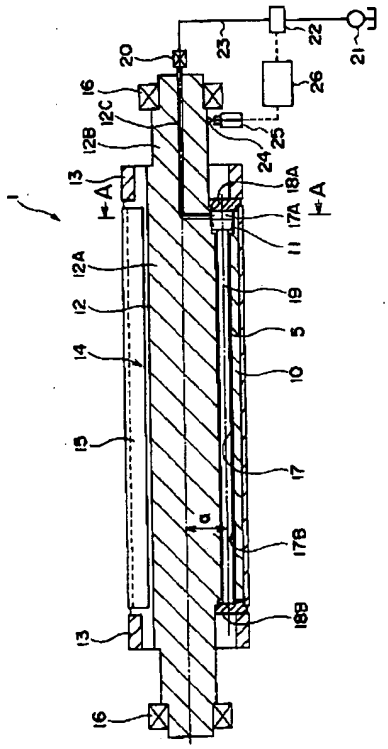
(54)【発明の名称】　印刷機のショックマーク防止装置

(57)【要約】

【課題】　印刷胴の周期的な振動の発生を抑制することにより印刷むらを減少させ、印刷品質の向上を図れるようになる印刷機のショックマーク防止装置を提供する。

【解決手段】　互いに所定の接触圧で接触して逆回転する複数の印刷胴１０の表面に、印刷胴１０の軸線と平行にゴムブランケット１５をクランプするためのクランプ溝１４が形成され、各印刷胴１０に、クランプ溝１４同士が会合する周期に合わせこれらの印刷胴１０をクランプ溝１４の反対側に曲げる曲げモーメント発生手段５を設けて印刷機のショックマーク防止装置１を構成する。そのため、印刷胴１０の振動の発生を抑制し、印刷むらを減少させ、印刷品質の向上を図れるようになる。



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【特許請求の範囲】

【請求項１】　互いに所定の接触圧で接触して逆回転する複数の印刷胴の表面に当該印刷胴の軸線と平行にそれぞれ版板またはゴムブランケットをクランプするためのクランプ溝が形成され、これらの印刷胴の回転に伴い前記クランプ溝同士が会合する際に生じる接触圧の変動を抑制する印刷機のショックマーク防止装置であって、

前記各印刷胴には、当該印刷胴内部に設けられるとともに、前記クランプ溝同士が会合する周期に合わせこれらの印刷胴を前記クランプ溝の反対側に曲げる押引き部材を含む曲げモーメント発生手段が設けられていることを特徴とする印刷機のショックマーク防止装置。

【請求項２】　請求項１に記載の印刷機のショックマーク防止装置において、前記各印刷胴は、版板またはゴムブランケットを巻き付ける胴部およびこの胴部の両端に当該胴部より小径に形成されたジャーナル部からなる胴本体と、この胴本体の前記胴部の両端に固着されたベアラとを備えて構成され、前記押引き部材は、前記胴本体の軸心と平行にかつその軸心から所定寸法オフセットした位置に設けられるとともに、流体圧によって曲げられるものであることを特徴とする印刷機のショックマーク防止装置。

【請求項３】　請求項２に記載の印刷機のショックマーク防止装置において、前記流体圧を利用した曲げモーメント発生手段は、前記押引き部材に作用する油圧ピストンと、前記ジャーナル部の端部から前記油圧ピストンが配置されたシリンダ室にわたって形成される油圧孔と、この油圧孔を介して前記シリンダ室に圧油を供給する油圧ポンプと、一端が回転継手を介して前記油圧孔に接続されるとともに他端が前記油圧ポンプに接続される油圧配管と、一端が回転継手を介して前記油圧孔に接続されるとともに他端が前記油圧ポンプに接続される油圧配管と、この油圧配管の途中に設けられ前記油圧ポンプからの圧油を前記シリンダ室に送出するサーボバルブと、前記印刷胴のクランプ溝の位置を検出しかつその信号を発信する検出器と、この検出器の信号に基づいて前記油圧ポンプからの圧油を、予め設置された押付け力と等しくなるように前記サーボバルブに指令を出す制御装置とを備えていることを特徴とする印刷機のショックマーク防止装置。

【請求項４】　請求項１に記載の印刷機のショックマーク防止装置において、前記各印刷胴は、版板またはゴムブランケットを巻き付ける胴部およびこの胴部の両端に当該胴部より小径に形成されたジャーナル部からなる胴本体と、この胴本体の前記胴部の両端に固着されたベアラとを備えて構成され、前記曲げモーメント発生手段は、前記胴部内に前記胴本体の軸心と平行にかつその軸心から所定寸法オフセットした位置に設けられた押引き部材と、この押引き部材に作用する圧電素子と、前記ジャーナル部の端部から前記圧電素子が配置された室内にわたって形成される配線孔と、一端が前記圧電素子に接続されるとともに他端は前記配線孔に通されかつスリップリングを介して外部に延出され前記圧電素子に電気を供給する電線と、前記印刷胴のクランプ溝の位置を検出しかつその信号を発信する検出器と、前記電線の一端が接続されるとともに前記検出器の信号に基づいて前記圧電素子に予め設定された押付け力と等しくなるような力を発生させる制御装置とを備えていることを特徴とする印刷機のショックマーク防止装置。

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【発明の詳細な説明】

【０００１】

【発明の属する技術分野】本発明は、オフセット印刷の印刷時に生じる印刷紙へのショックマークを防止する印刷機のショックマーク防止装置に関する。

【０００２】

【背景技術】オフセット印刷機における版胴およびゴム胴等の印刷胴には、その外周に金属平板の刷版またはゴムブランケットが巻き付けられている。そして、これらのゴムブランケット等はその端部が各胴の軸線に沿って形成されたクランプ溝にクランプされて固定されている。従って、これらのクランプ溝は、互いに接している版胴とブランケット胴、またはブランケット胴とブランケット胴同士の接点で１回転ごとに出会うようになっている。

【０００３】

【発明が解決しようとする課題】ところで、印刷運転の際には、各胴が一定圧力で互いに押圧しながら接触回転している。そのため、印刷中に胴同士の接点にクランプ溝が位置しない状態では接触する胴間には接触圧力が作用しているが、接点においてクランプ溝が出会う状態に至ると上記接触圧力が抜ける状態となる。つまり、印刷胴に作用する外力が周期的に変動することになる。この接触圧力抜けは、各胴のクランプ溝部の半径がわずかに沈み込んでいるために発生するもので、オフセット印刷においては必然的に生ずるものである。従って、印刷胴の１回転ごとに溝部同士が出会うときのショックにより振動が発生し、この振動が印刷物にショックマークとして転写され、印刷された模様に「むら」を生じさせるので、印刷物の絵柄に悪影響を与えて不良印刷の原因となり、印刷品質を低下させるものとなっている。

【０００４】そこで、印刷胴の剛性を増すとともに、胴径の曲率を大きくしクランプ溝部の半径の沈み込みを小さくして振動を低くおさえるために、印刷胴の直径を大きくした印刷機（倍胴）も制作されているが、この場合、製作コストが高くなるという問題がある。また、各印刷胴の振動を減衰部材やダンパで低減する方法も提案されているが振動に多くの周波数成分が含まれるため、異なる印刷速度に対し、常に振動を有効に減衰させるのは困難である。さらに、振動発生源のクランプ溝をなくすため、シームレス版やシームレスブランケットを使用

する印刷機も提案されているが、版やブランケットの製造コストが高くなる上、印刷が進行するにつれてブランケットが印刷胴に対して次第にずれてきて、印刷品質が低下するという問題がある。

【０００５】本発明の目的は、印刷胴の周期的な振動の発生を抑制することにより印刷むらを減少させ、印刷品質の向上を図れるようになる印刷機のショックマーク防止装置を提供することにある。

【０００６】

【課題を解決するための手段】本発明は、印刷胴の内部に曲げモーメントを発生させる装置を設け、印刷胴の振動源である胴のクランプ溝同士における接触圧力の周期的な抜けが発生する周期に合わせて、抜けた接触圧力により生じる胴の弾性変形に相当する弾性変形を発生させる曲げモーメントを印刷胴に作用させて振動を低減させ、これにより印刷むらを減少させ印刷品質の向上を図ろうとするものである。具体的には、本発明に係る請求項１に記載の印刷機のショックマーク防止装置は、互いに所定の接触圧で接触して逆回転する複数の印刷胴の表面に当該印刷胴の軸線と平行にそれぞれ版板またはゴムブランケットをクランプするためのクランプ溝が形成され、これらの印刷胴の回転に伴いクランプ溝同士が会合する際に生じる接触圧の変動を抑制する印刷機のショックマーク防止装置であって、各印刷胴には、当該印刷胴内部に設けられるとともに、クランプ溝同士が会合する周期に合わせこれらの印刷胴をクランプ溝の反対側に曲げる押引き部材を含む曲げモーメント発生手段が設けられていることを特徴とするものである。

【０００７】以上において、印刷胴は、版胴、ゴム胴等をいい、また、押引き部材は、胴本体に曲げモーメントを伝達できる剛性を有するものであることが好ましく、丸棒、角棒等を使用できる。この場合、これらの固体に限らず、液体の膨張性を利用するものであってもよい。さらに、曲げモーメント発生手段としては、印刷胴を溝の反対側に弾性変形させるものであればどのような形式でもよく、油圧式、空圧式、電気式等限定されない。さらに、曲げモーメントは、クランプ溝会合状態の際における曲げモーメント発生手段による印刷胴の弾性変形と印刷胴の接触圧力による弾性変形の合計が、クランプ溝会合状態以外の通常の接触状態の場合に印刷胴に働く力による弾性変形とほぼ同一となるような強さであることが好ましい。

【０００８】このように本発明では、各印刷胴はそれぞれのクランプ溝が会合する際に、曲げモーメント発生手段によりクランプ溝の反対側に弾性変形させられるので、クランプ溝同士の接点において低減する接触圧により減少する弾性変形を補償して、クランプ溝会合状態の際における曲げモーメント発生手段による弾性変形と印刷胴の弾性変形とを同一となるようにすることができる。従って、印刷胴の振動の発生が抑制されて印刷むらが減少し、印刷品質の向上を図れるようになる。

【０００９】本発明の請求項２に記載の印刷機のショックマーク防止装置は、請求項１に記載の印刷機ショックマーク防止装置の各印刷胴は、版板またはゴムブランケットを巻き付ける胴部およびこの胴部の両端に当該胴部より小径に形成されたジャーナル部からなる胴本体と、この胴本体の胴部の両端に固着されたベアラとを備えて構成され、押引き部材は、胴本体の軸心と平行にかつその軸心から所定寸法オフセットした位置に設けられるとともに、流体圧によって曲げられるものであることを特徴とするものである。

【００１０】以上において、流体圧を利用する曲げモーメント発生手段としては、油圧式、空圧式等によるものが挙げられる。この場合、油圧ピストン、空圧シリンダを使用して胴に力を作用させてもよく、あるいは、圧油、圧縮空気を直接胴に設けた穴に供給し胴に生じる曲げモーメントを利用するものであってもよい。このような本発明では、簡単な装置で容易に曲げモーメントを発生させることができる。

【００１１】本発明の請求項３に記載の印刷機のショックマーク防止装置は、請求項２に記載の印刷機のショックマーク防止装置の曲げモーメント発生手段は、押引き部材に作用する油圧ピストンと、ジャーナル部の端部から油圧ピストンが配置されたシリンダ室にわたって形成される油圧孔と、この油圧孔を介してシリンダ室に圧油を供給する油圧ポンプと、一端が回転継手を介して油圧孔に接続されるとともに他端が油圧ポンプに接続される油圧配管と、一端が回転継手を介して油圧孔に接続されるとともに他端が油圧ポンプに接続される油圧配管と、この油圧配管の途中に設けられ油圧ポンプからの圧油をシリンダ室に送出するサーボバルブと、印刷胴のクランプ溝の位置を検出しかつその信号を発信する検出器と、この検出器の信号に基づいて油圧ポンプからの圧油を、予め設置された押付け力と等しくなるようにサーボバルブに指令を出す制御装置とを備えていることを特徴とするものである。

【００１２】このような本発明では、印刷胴のクランプ溝の位置を検出する検出器の信号に基づいてクランプ溝の反対側を、制御装置により、予め設置された押付け力と等しくなるような圧油を油圧ピストンに供給することができるので、クランプ溝同士の接点において低減する接触圧により低減する弾性変形を補償して、クランプ溝会合状態の際における曲げモーメント発生手段による弾性変形と印刷胴の弾性変形とを同一となるようにすることができる。従って、印刷胴の振動の発生が抑制されて印刷むらが減少し、印刷品質の向上を図ることができる。

【００１３】本発明の請求項４に記載の印刷機のショックマーク防止装置は、請求項１または２に記載の印刷機ショックマーク防止装置の各印刷胴は、版板またはゴム

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ブランケットを巻き付ける胴部およびこの胴部の両端に当該胴部より小径に形成されたジャーナル部からなる胴本体と、この胴本体の胴部の両端に固着されたベアラとを備えて構成され、曲げモーメント発生手段は、胴部内に胴本体の軸心と平行にかつその軸心から所定寸法オフセットした位置に設けられた押引き部材と、この押引き部材に作用する圧電素子と、ジャーナル部の端部から圧電素子が配置された室内にわたって形成される配線孔と、一端が圧電素子に接続されるとともに他端は配線孔に通されかつスリップリングを介して外部に延出され圧電素子に電気を供給する電線と、印刷胴のクランプ溝の位置を検出しかつその信号を発信する検出器と、電線の一端が接続されるとともに検出器の信号に基づいて圧電素子に予め設定された押付け力と等しくなるような力を発生させる制御装置とを備えていることを特徴とするものである。

【００１４】以上において、圧電素子は１個だけでなく複数個使用してもよい。このような本発明では、装置を小型化することができるとともに、電圧の微調整が可能かつ容易なので、迅速かつ正確に、クランプ溝会合状態の際における圧電素子による弾性変形と印刷胴の弾性変形とを同一となるようにすることができる。従って、印刷胴の振動の発生が抑制されて印刷むらが減少し、印刷品質の向上を図ることができる。

【００１５】

【発明の実施の形態】（第１実施形態）図１、２に示すように、本発明の第１実施形態の印刷機のショックマーク防止装置１は、印刷胴１０に油圧ピストン１１、押し引き部材としての棒部材１９等を含む曲げモーメント発生手段５を設けて構成されている。すなわち、印刷胴１０は胴本体１２とベアラ１３とを備えて形成されており、胴本体１２は、胴部１２Ａおよびこの胴部１２Ａの両端に当該胴部１２Ａより小径に形成されたジャーナル部１２Ｂを有して形成されている。

【００１６】胴部１２Ａにはクランプ溝１４が設けられており、このクランプ溝１４には、胴部１２Ａの外周に巻き付けられたゴム等からなるブランケット１５の一端部が巻き取られかつ固着されている。胴本体１２は軸受１６により回転自在に支承されており、図示しない駆動装置等により回転速度及び印刷ユニットを構成する一群の胴の相互角度関係が維持されている。

【００１７】このような胴部１２Ａの長手方向には、その一端から他端にわたって印刷胴１０の軸心と平行な段付き孔１７が明けられている。この段付き孔１７は、図２にも示すように、印刷胴１０の軸心からオフセットしたクランプ溝１４と対向する位置に明けられており、段付き孔１７の一端側のシリンダ室としての大径部１７Ａに、前記油圧ピストン１１が設けられている。また、段付き孔１７の両端は胴部１２Ａに固着された蓋部材１８Ａ、１８Ｂにより塞がれている。そして、このような段

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付き孔１７の小径部１７Ｂには、油圧ピストン１１の一端部の蓋部材１８Ａと胴部１２Ａの他端側の蓋部材１８Ｂとに接触する前記棒部材１９が挿入されている。

【００１８】このような油圧ピストン１１は、胴本体１２に形成された油圧孔１２Ｃにより胴本体１２の一端面に取付けられた回転継手２０に連通している。この回転継手２０には油圧ポンプ２１からサーボバルブ２２を経由して配管２３により圧油が供給されるようになっている。また、胴本体１２にはクランプ溝１４の位置を検出するためのドグ２４が設けられ、印刷機のフレームには検出器２５が設けられている。そして、この検出器２５は、互いに接する印刷胴同士のクランプ溝１４が接点において会合するタイミングで信号を出すようになっている。制御装置２６はクランプ溝会合の信号を受けると、予め設定された、抜けた接触圧力による胴の弾性変形の減少を補償するパターンの油圧を発生させる指令を前記サーボバルブ２２に出力するようになっている。

【００１９】そして、ここにおいて、油圧ピストン１１、および棒部材１９から制御装置２６に至る連続する符号の各部材を含んで前記曲げモーメント発生手段５が構成されている。

【００２０】従って、制御された圧油が油圧孔１２Ｃを経由して段付き孔１７の大径部に供給されると、油圧ピストン１１と蓋部材１８Ａとの間に発生した力は棒部材１９を介して反対側の蓋部材１８Ｂに伝えられる。段付き穴１７は胴の図心からａだけオフセットしているので、胴本体１２には、当該胴本体１２をクランプ溝１４の反対側に曲げる曲げモーメントが発生することになる。

【００２１】ここで、本発明によるショックマーク防止装置１の効果を印刷胴に作用する力関係により説明する。図２に示すように、互いに接する印刷胴１０、１０Ａには、その接点において、接触圧力Ｗが一方の胴１０を相手胴１０Ａから離反させる方向に作用している。このような弾性変形の状態を図３に示す。そして、この状態における印刷胴の弾性変形δ１は次の式で与えられる。

$$\delta 1 = 5 * w * L' / (384 * E * I)$$

ここで、ｗ：胴同士の単位長さ当たりの接触力

Ｌ：胴の面長

Ｅ：胴材料のヤング率

Ｉ：胴部の断面二次モーメント

【００２２】接点にクランプ溝１４同士が会合する回転角度に至ると、接触圧力は低減する。しかし、ドグ２４と検出器２５とによるクランプ溝１４会合信号で油圧ピストン１１が、接触圧力が低減したために減少した弾性変形に相当する曲げモーメントを印刷胴１０に作用させるので、印刷胴１０の弾性変形の合計はクランプ溝１４の会合状態でも他の状態（非会合状態）と同じとなる。

【００２３】図４に曲げモーメントを作用させた場合の

弾性変形の状態を示す。そして、この状態における胴の弾性変形δ２は次の式で与えられる。

$\delta 2 = a * F * L^2 / (8 * E * I)$

ここで、ａ：油圧ピストン中心と胴本体中心との距離

Ｆ：油圧ピストンの発生する力

【００２４】クランプ溝１４同士が会合した時、印刷胴１０同士の単位長さ当たりの接触力がｗからｗ’に変形した場合、それによる弾性変形を補償するのに必用な油圧ｐは次の計算式により求めることができる。

$\delta' = 5 * (w - w') * L^4 / (384 * E * I)$

$a * F * L^2 / (8 * E * I) = 5 * (w - w') * L^4 / (384 * E * I)$

$F = 5 * (w - w') * L^2 / (48 * a)$

$p = 5 * (w - w') * L^2 / (48 * a) / A$

ここで、Ａ：油圧ピストンの受圧面積

従って、印刷胴１０の接触圧力が低減する量に応じて油圧ピストン１１に、上記式により求めた油圧ｐを作用させれば振動を防止し、振動に起因する印刷むらを防止することができるようになっている。

【００２５】（第２実施形態）図５、６に示すように、本発明の第２実施形態の印刷機のショックマーク防止装置２は、前記第１実施形態が、印刷胴１０に、曲げモーメント発生手段５として油圧ピストン１１等を備えたものを設けたものであるのに対して、印刷胴３０の内部の受圧孔３７に直接油圧を作用させる曲げモーメント発生手段６としたものである。なお、本第２実施形態および次に述べる第３実施形態において、前記第１実施形態と同様の構造、構成部材等には同一符号を付すとともに、その詳細な説明は省略または簡略化する。

【００２６】印刷胴３０における胴本体３２の胴部３２Ａの長手方向には、その一端から他端にわたって印刷胴３０の軸心と平行な受圧孔３７が明けられている。この受圧孔３７は、同一径で形成されるとともに、印刷胴３０の軸心からオフセットしたクランプ溝３４と対向する位置に明けられている。つまり、前記段付き孔１７に代わるものである。また、この受圧孔３７には、胴本体３２の軸心に沿ってジャーナル部３２Ｂの一端部から胴本体３２の長手方向の途中まで延びるとともに、そこから径方向に明けられた油圧孔３２Ｃが接続されている。

【００２７】従って、制御された圧油が油圧孔３２Ｃを経由して受圧孔３７に供給されると、受圧孔３７の両端に固定された蓋部材１８Ａ、１８Ｂ間に受圧孔３７の面積に圧力を掛けた力が発生する。受圧孔３７は胴の図心からａだけオフセットしているので、胴本体３２には、当該胴本体３２をクランプ溝３４の反対側に曲げる曲げモーメントが発生することになる。

【００２８】このような本第２実施形態においても、その作用および力や弾性変形の関係式は前記第１実施形態と同じである。また、この実施形態でも前記第１実施形態と同様の効果を得ることができる他、胴本体３２の断面に余裕がある場合に適用すれば、油圧ピストン等を不要とできるので、構造が簡単になり、これにより、製造コストを安くでき、かつ、故障が少ないという利点がある。

【００２９】（第３実施形態）図６、７に示すように、本発明の第３実施形態の印刷機のショックマーク防止装置３は、前記各実施形態が、印刷胴１０、３０に、油圧を利用した曲げモーメント発生手段５、５としたものであるのに対して、圧電素子を利用した曲げモーメント発生手段７としたものである。

【００３０】すなわち、印刷胴４０における胴本体４２の胴部４２Ａの長手方向には、その一端から他端にわたって印刷胴４０の軸心と平行なアクチュエータ用挿通孔４７が明けられている。このアクチュエータ用挿通孔４７は、印刷胴４０の軸心からオフセットしたクランプ溝４４と対向する位置に明けられている。つまり、前記段付き孔１７、油圧孔３２Ｃに代わるものである。また、この挿通孔４７には、胴本体４２の軸心に沿ってジャーナル部４２Ｂの一端部から胴本体４２の長手方向の途中まで延びるとともに、そこから径方向に明けられた配線孔４２Ｃが接続されている。

【００３１】このアクチュエータ用挿通孔４７の小径部内には、圧電素子アクチュエータを構成する押し引き部材としての棒部材４１が挿入かつ固定支持され、室内である大径部内には、棒部材４１の力の発生源となる１個の圧電素子４３が設けられている。この圧電素子４３に電圧を供給する電線４５は、胴本体４２に設けられた配線孔４２Ｃを通じて胴本体４２の端面に取付けられたスリップリング４８に接続されている。このスリップリング４８には制御装置４６から電線４５により電圧が供給されるようになっている。また、制御装置４６は、クランプ溝会合の信号を受けると、予め設定された弾性変形補償パターンの電圧を発生させ、圧電素子４３に出力するようになっている。

【００３２】従って、制御装置４６から電線４５により電圧が供給されると、圧電素子４３に歪みが発生し膨張状態となり、棒部材４１を介して蓋部材１８Ａと１８Ｂとの間に力を発生させる。アクチュエータ用挿通孔４７は胴の図心からａだけオフセットしているので、胴本体４２には当該胴本体４２をクランプ溝４４の反対側に曲げる曲げモーメントが発生することになる。

【００３３】このような本第３実施形態においても、その作用及び力や弾性変形の関係式は前記第１実施形態と同じである。また、この実施形態でも前記各実施形態と同様の効果を得ることができる他、装置を小型化することができるとともに、電圧の微調整が可能かつ容易なので、迅速かつ正確に、クランプ溝会合状態の際における圧電素子４３による弾性変形と印刷胴の弾性変形とを同一となるようにすることができる。従って、印刷胴の振動の発生が抑制されて印刷むらが減少し、印刷品質の向

上を図ることができるという効果がある。

【００３４】

【発明の効果】以上に説明したように、本発明の印刷機の印刷機のショックマーク防止装置によれば、接点にクランプ溝同士が会合する回転角度に至った時の接触圧力低減による弾性変形減少分を、曲げモーメント発生手段により補償させるので印刷胴の弾性変形の合計はクランプ溝会合状態でも他の状態と同じとなる。従って、印刷胴の撓みが周期的に変動することがないので振動を防止し、振動に起因する印刷むらを防止することができ、印刷品質の向上を図れるようになる。

【図面の簡単な説明】

【図１】本発明に係る第１実施形態の印刷機のショックマーク防止装置を示す縦断面図である。

【図２】図１のＡ－Ａ断面を示す図である。

【図３】本実施形態の印刷中の印刷胴にかかる力と弾性変形の状態を示す図である。

【図４】本実施形態の印刷胴に曲げモーメントを作用させた場合の弾性変形の状態を示す図である。

【図５】本発明に係る第２実施形態の印刷機のショックマーク防止装置を示す縦断面図である。

【図６】本発明に係る第３実施形態の印刷機のショック＊

＊マーク防止装置を示す縦断面図である。

【図７】図６のＣ－Ｃ断面を示す図である。

【符号の説明】

１、２、３　印刷機のショックマーク防止装置

５、７　曲げモーメント発生手段

１０　印刷胴

１１　曲げモーメント発生手段を構成する油圧ピストン

１２　胴本体

１２Ａ　胴部

１２Ｂ　ジャーナル部

１２Ｃ　油圧孔

１４　クランプ溝

１９　押し引き部材を構成する棒部材

２１　油圧ポンプ

２５　検出器

２６　制御装置

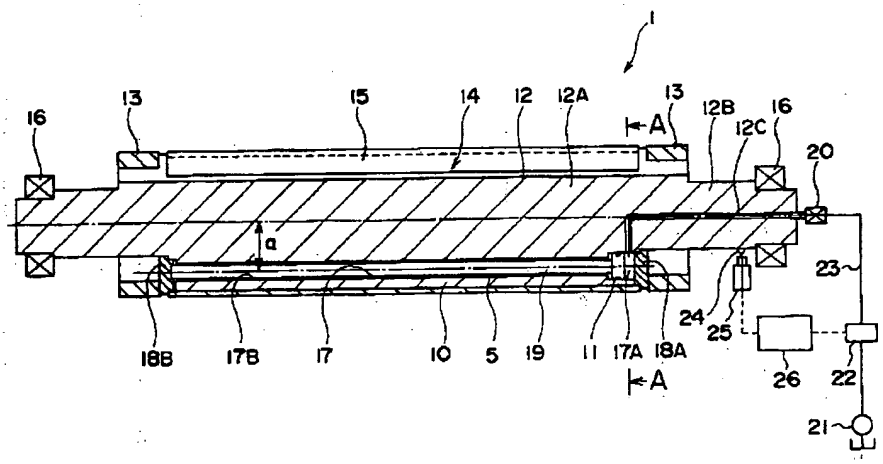
３７　受圧孔

４３　圧電素子

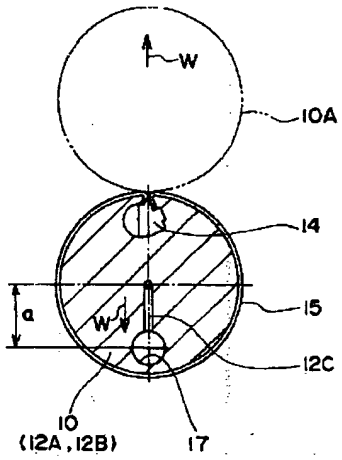
４５　電線

４６　制御装置

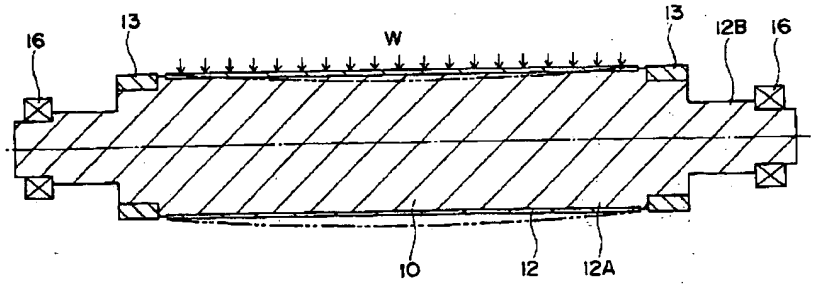
【図１】



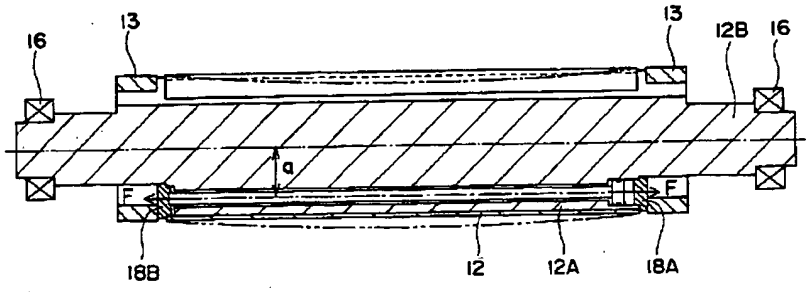
【図２】



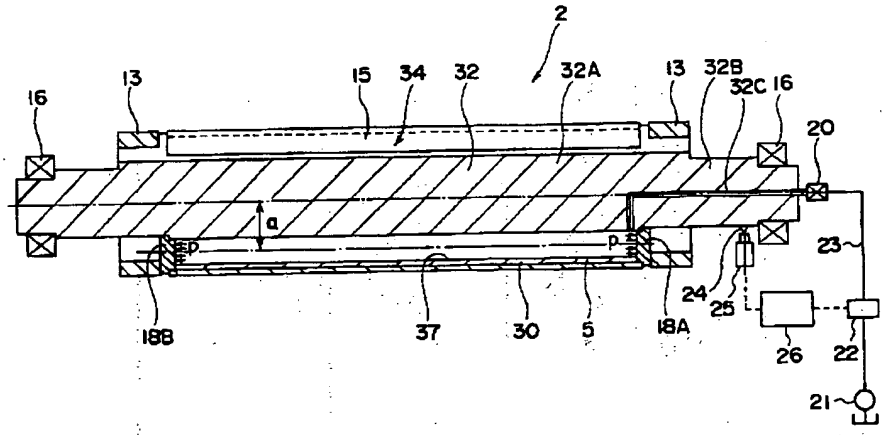
【図３】



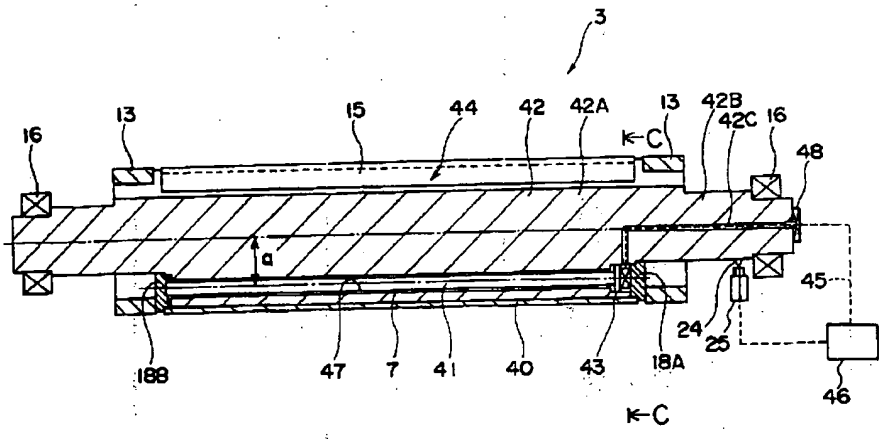
【図４】


16
13
13
12B
16
a
F
F
18B
12
12A
18A

【図５】


2
16
13
15
34
32
32A
13
32B
32C
16
20
a
23
24
25
26
22
21
18B
37
30
5
18A

【図６】


3
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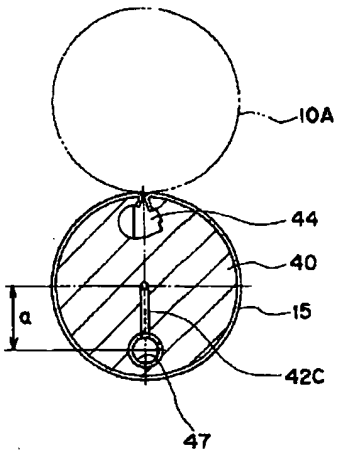
42
42A
13
42B
42C
16
48
K-C
a
45
24
25
46
18B
47
7
41
40
43
18A
K-C

【図７】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44
40
a
15
42C
47

PATENT ABSTRACTS OF JAPAN

(11)Publication number : 11-170474

(43)Date of publication of application : 29.06.1999

(51)Int.Cl. B41F 7/02
B41F 13/00
B41F 13/08
B41F 33/00

(21)Application number : 09-335589

(22)Date of filing : 05.12.1997

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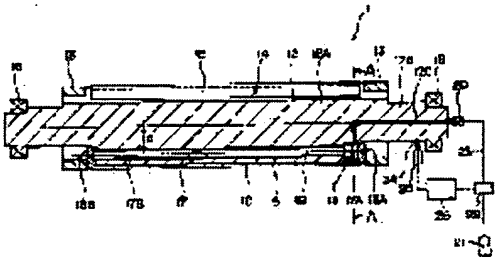
(72)Inventor : SUZUKI KATSUYUKI

(54) SHOCK MARK PREVENTING APPARATUS FOR PRINTER

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a shock mark preventing apparatus for a printer for improving a printing quality by suppressing a periodic vibration of a printing cylinder, thereby reducing a printing unevenness.



SOLUTION: The shock mark preventing apparatus I for a printer is constituted by forming a clamping groove 14 for clamping a rubber blanket 15 parallel to an axis of a printing cylinder 10 on a surface of a plurality of printing cylinders 10 reversely rotating in contact with each other by predetermined contact pressure, and providing a bending moment generating means 5 for ending the cylinders 10 at an opposite side of the groove 14 on each cylinder 10 to match a period for meeting the grooves 14. Thus, a vibration of the cylinder 10 is suppressed, a printing unevenness is reduced, and a printing quality is improved.

LEGAL STATUS

[Date of request for examination]

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or

application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of rejection]

[Date of requesting appeal against examiner's decision of rejection]

[Date of extinction of right]

CLAIMS

[Claim(s)]
[Claim 1] The clamp slot for clamping a version plate or a rubber blanket to the axis of the printing drum concerned and parallel, respectively is formed in the front face of two or more printing drums which contact and carry out inverse rotation by predetermined contact pressure. It is the shock-mark arrester of the printing machine which controls fluctuation of the contact pressure produced in case said clamp slots meet with rotation of these printing drums. On said each printing drum The shock-mark arrester of the printing machine characterized by establishing the bending moment generating means containing push-pull ****** which doubles with the period to which said clamp slots meet, and bends these printing drums to the opposite side of said clamp slot while being prepared in the interior of the printing drum concerned.
[Claim 2] In the shock-mark arrester of a printing machine according to claim 1 said each printing drum The drum body which consists of the journal section formed in the drum section which twists a version plate or a rubber blanket, and the both ends of this drum section from the drum section concerned in the minor diameter, It has the bearer which fixed to the both ends of said drum section of this drum body, and is constituted. Said push-pull ****** The shock-mark arrester of the printing machine characterized by being what bent by hydrostatic pressure while being prepared in the location which carried out predetermined dimension offset from the axial center in parallel with the axial center of said drum body.
[Claim 3] In the shock-mark arrester of a printing machine according to claim 2, a bending moment generating means by which said hydrostatic pressure was used The oil pressure piston which acts on said push-pull ******, and the oil pressure hole formed over the cylinder room where said oil pressure piston has been arranged from the edge of said journal section, The hydraulic pump which supplies a pressure oil to said cylinder room through this oil pressure hole, The hydraulic line by which the other end is connected to said hydraulic pump while an end is connected to said oil pressure hole through a swivel joint, The hydraulic line by which the other end is connected to said hydraulic pump while an end is connected to said oil pressure hole through a swivel joint, The servo valve which is prepared in the middle of this hydraulic line, and sends out the pressure oil from said hydraulic pump to said cylinder room, The detector which detects the location of the clamp slot of said printing drum, and sends the signal, The shock-mark arrester of the printing machine characterized by having the control unit which was beforehand installed in the pressure oil from said hydraulic pump based on the signal of this detector, and which takes out a command to said servo valve so that it may push and may become equal to the force.
[Claim 4] In the shock-mark arrester of a printing machine according to claim 1 said each printing drum The drum body which consists of the journal section formed in the drum section which twists a version plate or a rubber blanket, and the both ends of this drum section from the drum section concerned in the minor diameter, It has the bearer which fixed to the both ends of said drum section of this drum body, and is constituted. Said bending moment generating means In said drum section, to the axial center of said drum body, and parallel And push-pull ****** prepared in the location which carried out predetermined dimension offset from the axial center, The piezoelectric device which acts on this push-pull ******, and the wiring hole formed over the interior of a room where said piezoelectric device has been arranged from the edge of said journal section, The electric wire which said wiring hole lets the other end pass, and extends outside through the slip ring, and supplies

the electrical and electric equipment to said piezoelectric device while an end is connected to said piezoelectric device, The detector which detects the location of the clamp slot of said printing drum, and sends the signal, The shock-mark arrester of the printing machine characterized by having the control unit made to generate force which was beforehand set as said piezoelectric device based on the signal of said detector while the end of said electric wire was connected, and which pushes and becomes equal to the force.

[Translation done.]

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention relates to the shock-mark arrester of the printing machine which prevents the shock mark to the printing paper produced at the time of printing of offset printing.
[0002]
[Background of the Invention] The lithographic plate or rubber blanket of a metal plate is twisted around printing drums, such as a printing cylinder in the offset press, and a blanket cylinder, at the periphery. And these rubber blankets etc. are being clamped and fixed to the clamp slot in which the edge was formed along with the axis of each drum. Therefore, these clamp slots meet for every rotation at the printing cylinder which has touched mutually, a blanket drum or a blanket drum, and the contact of blanket drums.
[0003]
[Problem(s) to be Solved by the Invention] By the way, in the case of printing operation, while each drum presses mutually by the constant pressure, contact rotation is carried out. Therefore, although contact pressure is acting in the condition that a clamp slot is not located during printing at the contact of drums, between the drums which contact, if it results in the condition that a clamp slot meets in a contact, it will be in the condition that the above-mentioned contact pressure falls out. That is, the external force which acts on a printing drum will be changed periodically. Since the radius of the clamp slot of each drum has sunk slightly, it generates, and this contact pressure omission is inevitably produced in offset printing. Therefore, vibration occurs by the shock in case slots meet for every rotation of a printing drum, since this vibration is imprinted by printed matter as a shock mark and makes a pattern that it was printed produce "unevenness", it has a bad influence on the pattern of printed matter, and it becomes the cause of defect printing, and printing quality is reduced.
[0004] Then, although the printing machine (double drum) which enlarged the diameter of a printing drum is also made in order to enlarge the curvature of a shell diameter, to make subduction of the radius of a clamp slot small and to press down vibration low, while increasing the rigidity of a printing drum, there is a problem that manufacture cost becomes high in this case. Moreover, although the method of reducing vibration of each printing drum with an attenuation member or a damper is also proposed, since many frequency components are contained in vibration, it is difficult to always carry out the decay of the vibration effectively to a different print speed. Furthermore, although the printing machine which uses the seamless version and a seamless blanket is also proposed in order to lose the clamp slot of an oscillating generation source, when the manufacturing cost of a version or a blanket becomes high, a blanket shifts gradually to a printing drum as printing advances, and there is a problem that printing quality deteriorates.
[0005] By controlling generating of a periodic vibration of a printing drum, the purpose of this invention decreases printing unevenness and is to offer the shock-mark arrester of the printing machine which can aim at improvement in printing quality now.
[0006]
[Means for Solving the Problem] This invention forms the equipment which makes generate the bending moment in the interior of a printing drum, makes the bending moment which generates the

elastic deformation equivalent to the elastic deformation of the drum which produces with the contact pressure from which it escaped act on a printing drum according to the period which the periodic omission of the contact pressure in the clamp slots of the drum which is the source of vibration of a printing drum generates, tends to reduce vibration, tends to decrease printing unevenness by this, and tends to plan improvement in printing quality. The shock-mark arrester of the printing machine according to claim 1 concerning this invention specifically The clamp slot for clamping a version plate or a rubber blanket to the axis of the printing drum concerned and parallel, respectively is formed in the front face of two or more printing drums which contact and carry out inverse rotation by predetermined contact pressure. It is the shock-mark arrester of the printing machine which controls fluctuation of the contact pressure produced in case clamp slots meet with rotation of these printing drums. On each printing drum While being prepared in the interior of the printing drum concerned, it is characterized by establishing the bending moment generating means containing push-pull ****** which doubles with the period to which clamp slots meet, and bends these printing drums to the opposite side of a clamp slot.

[0007] It is desirable that it is what has the rigidity which a printing drum calls a printing cylinder, a blanket cylinder, etc. above, and push-pull ****** can deliver the bending moment to a drum body, and it can use the round bar, a square bar, etc. In this case, the expansibility of not only these solid-states but a liquid may be used. Furthermore, as a bending moment generating means, if the opposite side of a slot is made to carry out elastic deformation of the printing drum, what kind of format will be sufficient and an oil pressure controller, a pneumatics type, an electric type, etc. will not be limited. Furthermore, as for the bending moment, it is desirable that it is the strength from which the sum total of the elastic deformation of the printing drum by the bending moment generating means in the case of a clamp slot meeting condition and the elastic deformation by the contact pressure of a printing drum becomes almost the same as that of the elastic deformation by the force which is committed on a printing drum in the case of usual contact conditions other than a clamp slot meeting condition.

[0008] Thus, since elastic deformation of each printing drum is carried out to the opposite side of a clamp slot with a bending moment generating means in case each clamp slot meets, the elastic deformation which decreases by the contact pressure reduced in the contact of clamp slots is compensated with this invention, and it can become the same by it about the elastic deformation by the bending moment generating means and the elastic deformation of a printing drum in the case of a clamp slot meeting condition. Therefore, generating of vibration of a printing drum is controlled, printing unevenness decreases, and improvement in printing quality can be aimed at now.

[0009] The shock-mark arrester of the printing machine of this invention according to claim 2 Each printing drum of a printing machine shock-mark arrester according to claim 1 The drum body which consists of the journal section formed in the drum section which twists a version plate or a rubber blanket, and the both ends of this drum section from the drum section concerned in the minor diameter, It has the bearer which fixed to the both ends of the drum section of this drum body, and is constituted, and push-pull ****** is characterized by being what is bent by hydrostatic pressure while it is prepared in the location which carried out predetermined dimension offset from that axial center in parallel with the axial center of a drum body.

[0010] As a bending moment generating means to use hydrostatic pressure above, what is depended on an oil pressure controller, a pneumatics type, etc. is mentioned. In this case, the bending moment which supplies to the hole which the force could be made to act on a drum using an oil pressure piston and a pneumatics cylinder, or prepared a pressure oil and the compressed air in the direct drum, and is produced on a drum may be used. In such this invention, the bending moment can be easily generated with easy equipment.

[0011] The shock-mark arrester of the printing machine of this invention according to claim 3 The bending moment generating means of the shock-mark arrester of a printing machine according to claim 2 The oil pressure piston which acts on push-pull ******, and the oil pressure hole formed over the cylinder room where the oil pressure piston has been arranged from the edge of the journal section, The hydraulic pump which supplies a pressure oil to a cylinder room through this oil pressure hole, and the hydraulic line by which the other end is connected to a hydraulic pump while an end is connected to an oil pressure hole through a swivel joint, The hydraulic line by which the

other end is connected to a hydraulic pump while an end is connected to an oil pressure hole through a swivel joint, The servo valve which is prepared in the middle of this hydraulic line, and sends out the pressure oil from a hydraulic pump to a cylinder room, It is characterized by having the control unit which was beforehand installed in the pressure oil from a hydraulic pump based on the signal of the detector which detects the location of the clamp slot of a printing drum, and sends that signal, and this detector and which takes out a command to a servo valve so that it may push and may become equal to the force.

[0012] Since a pressure oil which was beforehand installed by the control unit in the opposite side of a clamp slot in such this invention based on the signal of the detector which detects the location of the clamp slot of a printing drum and which pushes and becomes equal to the force can be supplied to an oil pressure piston The elastic deformation reduced by the contact pressure reduced in the contact of clamp slots is compensated, and it can become the same about the elastic deformation by the bending moment generating means and the elastic deformation of a printing drum in the case of a clamp slot meeting condition. Therefore, generating of vibration of a printing drum can be controlled, printing unevenness can decrease, and improvement in printing quality can be aimed at.

[0013] The shock-mark arrester of the printing machine of this invention according to claim 4 Each printing drum of a printing machine shock-mark arrester according to claim 1 or 2 The drum body which consists of the journal section formed in the drum section which twists a version plate or a rubber blanket, and the both ends of this drum section from the drum section concerned in the minor diameter, It has the bearer which fixed to the both ends of the drum section of this drum body, and is constituted. A bending moment generating means In a drum section, to the axial center of a drum body, and parallel And push-pull ****** prepared in the location which carried out predetermined dimension offset from the axial center, The piezoelectric device which acts on this push-pull ******, and the wiring hole formed over the interior of a room where the piezoelectric device has been arranged from the edge of the journal section, The electric wire which a wiring hole lets the other end pass, and extends outside through the slip ring, and supplies the electrical and electric equipment to a piezoelectric device while an end is connected to a piezoelectric device, It is characterized by having the detector which detects the location of the clamp slot of a printing drum, and sends the signal, and the control unit made to generate force which was beforehand set as the piezoelectric device based on the signal of a detector while the end of an electric wire was connected, and which pushes and becomes equal to the force.

[0014] Two or more piezoelectric devices may be used above not only in one piece. In such this invention, since fine tuning of an electrical potential difference is possible and easy while being able to miniaturize equipment, it can become the same quickly and correctly about the elastic deformation by the piezoelectric device and the elastic deformation of a printing drum in the case of a clamp slot meeting condition. Therefore, generating of vibration of a printing drum can be controlled, printing unevenness can decrease, and improvement in printing quality can be aimed at.

[0015]

[Embodiment of the Invention] (The 1st operation gestalt) As shown in drawing 1 and 2, the shock-mark arrester 1 of the printing machine of the 1st operation gestalt of this invention establishes the bending moment generating means 5 which contains the rod part material 19 grade as the oil pressure piston 11 and a push length member in the printing drum 10, and is constituted. That is, the printing drum 10 is equipped with the drum body 12 and a bearer 13, and is formed, and the drum body 12 has journal section 12B formed in the minor diameter from the drum section 12A concerned to the both ends of drum section 12A and this drum section 12A, and is formed in them.

[0016] The clamp slot 14 is established in drum section 12A, and the end section of the blanket 15 which consists of rubber twisted around the periphery of drum section 12A was rolled round by this clamp slot 14, and has fixed into it. a group which constitutes rotational speed and a printing unit with the driving gear which bearing of the rotation of the drum body 12 is made free by bearing 16, and is not illustrated -- relation is maintained whenever phase [of a drum] equal.

[0017] In such a longitudinal direction of drum section 12A, the hole 17 with a stage parallel to the axial center of the printing drum 10 has ended ranging from the end to the other end. As this hole 17 with a stage is shown also in drawing 2 , it has broken in the clamp slot 14 offset from the axial center of the printing drum 10, and the location which counters, and said oil pressure piston 11 is

formed in major diameter 17A as a cylinder room by the side of the end of the hole 17 with a stage. Moreover, the both ends of the hole 17 with a stage are closed by the covering device material 18A and 18B which fixed to drum section 12A. And said rod part material 19 in contact with covering device material 18B by the side of the other end of covering device material 18A of the end section of the oil pressure piston 11 and drum section 12A is inserted in such narrow diameter portion 17B of the hole 17 with a stage.

[0018] Such an oil pressure piston 11 is open for free passage to the swivel joint 20 attached in the end side of the drum body 12 by oil pressure hole 12C formed in the drum body 12. A pressure oil is supplied to this swivel joint 20 by piping 23 via a servo valve 22 from a hydraulic pump 21. Moreover, the dog 24 for detecting the location of the clamp slot 14 on the drum body 12 is formed, and the detector 25 is formed in the frame of a printing machine. And this detector 25 takes out a signal with the timing to which the clamp slot 14 of the printing drums which touch mutually meets in a contact. A control unit 26 will output the command which generates the oil pressure of the pattern with which reduction of the elastic deformation of the drum by the contact pressure from which it escaped set up beforehand is compensated to said servo valve 22, if the signal of a clamp slot meeting is received.

[0019] And in here, said bending moment generating means 5 is constituted including each part material of the continuous sign from the rod part material 19 to the oil pressure piston 11 and a control unit 26.

[0020] Therefore, if the controlled pressure oil is supplied to the major diameter of the hole 17 with a stage via oil pressure hole 12C, the force generated between the oil pressure piston 11 and covering device material 18A will be told to covering device material 18B of the opposite side through the rod part material 19. Since the hole 17 with a stage has offset only a from the center of figure of a drum, on the drum body 12, the bending moment which bends the drum body 12 concerned to the opposite side of the clamp slot 14 will occur.

[0021] Here, the power relationship which acts on a printing drum explains the effectiveness of the shock-mark arrester 1 by this invention. As shown in drawing 2 , in the contact, it is acting on the printing drums 10 and 10A which touch mutually in the direction in which contact pressure W makes one drum 10 desert partner drum 10A. The condition of such elastic deformation is shown in drawing 3 . And the elastic deformation delta 1 of the printing drum in this condition is given by the following formula.

delta1=5*w*L4/(384*E*I)

Young's-modulus [of the field length E:drum ingredient of a contact force L:drum per / which are w:drums here / unit length] I: The second moment of area of a drum section [0022] Contact pressure will be reduced if it results in a contact at angle of rotation to which clamp slot 14 comrades meet. However, with the clamp slot 14 meeting signal by the dog 24 and the detector 25, since the bending moment equivalent to the elastic deformation to which the oil pressure piston 11 decreased since contact pressure decreased is made to act on the printing drum 10, the sum total of the elastic deformation of the printing drum 10 becomes the same as other conditions (non congression condition) also in the meeting condition of the clamp slot 14.

[0023] The condition of the elastic deformation at the time of making the bending moment act on drawing 4 is shown. And the elastic deformation delta 2 of the drum in this condition is given by the following formula.

delta2=a*F*L2/(8*E*I)

Force which the distance F:oil pressure piston of a:oil pressure piston core and the core of a drum body generates here [0024] When clamp slot 14 comrades meet and the contact force per unit length of printing drum 10 comrades deforms into w[from w]', it can ask for the oil pressure p ****** for compensating the elastic deformation by it by the following formula.

delta'=5*(w-w') *L4/(384*E*I)

a*F*L2/(8*E*I)=5*(w-w')*L4/(384*E*I)

F=5*(w-w')*L2/(48*a

p=5*(w-w') *L2/(48*a)/A -- here, according to the amount which the projected net area of A:oil pressure piston, therefore the contact pressure of the printing drum 10 reduce, if the oil pressure p for which it asked by the above-mentioned formula is made to act on the oil pressure piston 11, vibration

will be prevented, and the printing unevenness resulting from vibration can be prevented now.
[0025] (The 2nd operation gestalt) As shown in drawing 5 and 6, said 1st operation gestalt makes the shock-mark arrester 2 of the printing machine of the 2nd operation gestalt of this invention a bending moment generating means 6 to make direct oil pressure act on the pressure receiving hole 37 inside the printing drum 30 to preparing what equipped the printing drum 10 with the oil pressure piston 11 grade as a bending moment generating means 5. In addition, in the 3rd operation gestalt stated to a **** 2 operation gestalt and a degree, while giving the same sign to the same structure as said 1st operation gestalt, and a configuration member, the detailed explanation is omitted or simplified.
[0026] In the longitudinal direction of drum section 32A of the drum body 32 in the printing drum 30, the pressure receiving hole 37 parallel to the axial center of the printing drum 30 has ended ranging from the end to the other end. This pressure receiving hole 37 has ended in the clamp slot 34 offset from the axial center of the printing drum 30, and the location which counters while being formed with the diameter of the same. That is, said hole 17 with a stage is replaced. Moreover, while extending along with the axial center of the drum body 32 from the end section of journal section 32B to the middle of the longitudinal direction of the drum body 32, oil pressure hole 32C which ended in the direction of a path from there is connected to this pressure receiving hole 37.
[0027] Therefore, if the controlled pressure oil is supplied to the pressure receiving hole 37 via oil pressure hole 32C, the force which put the pressure at the area of the pressure receiving hole 37 between covering device material 18A fixed to the both ends of the pressure receiving hole 37 and 18B will occur. Since the pressure receiving hole 37 has offset only a from the center of figure of a drum, on the drum body 32, the bending moment which bends the drum body 32 concerned to the opposite side of the clamp slot 34 will occur.
[0028] Also in such a **** 2 operation gestalt, the relational expression of the operation and force, and elastic deformation is the same as said 1st operation gestalt. Moreover, if the same effectiveness as said 1st operation gestalt can be acquired also with this operation gestalt, and also it applies when allowances are in the cross section of the drum body 32, since an oil pressure piston etc. will be made as it is unnecessary, structure becomes easy, thereby, a manufacturing cost can be made cheap and there is an advantage that there is little failure.
[0029] (The 3rd operation gestalt) As shown in drawing 6 and 7, said each operation gestalt makes the shock-mark arrester 3 of the printing machine of the 3rd operation gestalt of this invention a bending moment generating means 7 by which the piezoelectric device was used for the printing drums 10 and 30 to considering as bending moment generating means 5 and 5 by which oil pressure was used.
[0030] That is, in the longitudinal direction of drum section 42A of the drum body 42 in the printing drum 40, the insertion hole 47 for actuators parallel to the axial center of the printing drum 40 has ended ranging from the end to the other end. This insertion hole 47 for actuators has ended in the clamp slot 44 offset from the axial center of the printing drum 40, and the location which counters. That is, said hole 17 with a stage and oil pressure hole 32C are replaced. Moreover, while extending along with the axial center of the drum body 42 from the end section of journal section 42B to the middle of the longitudinal direction of the drum body 42, wiring hole 42C which ended in the direction of a path from there is connected to this insertion hole 47.
[0031] In the narrow diameter portion of this insertion hole 47 for actuators, the rod part material 41 as a push length member which constitutes a piezoelectric-device actuator is inserted and fixed supported, and one piezoelectric device 43 used as the generation source of the force of the rod part material 41 is formed in the major diameter which is the interior of a room. The electric wire 45 which supplies an electrical potential difference to this piezoelectric device 43 is connected to the slip ring 48 attached in the end face of the drum body 42 through wiring hole 42C prepared in the drum body 42. An electrical potential difference is supplied to this slip ring 48 with an electric wire 45 from a control unit 46. Moreover, if the signal of a clamp slot meeting is received, a control unit 46 will generate the electrical potential difference of the elastic-deformation compensation pattern set up beforehand, and will be outputted to a piezoelectric device 43.
[0032] Therefore, if an electrical potential difference is supplied with an electric wire 45 from a control unit 46, distortion occurs in a piezoelectric device 43, it will be in an expansion condition and the force will be generated between the covering device material 18A and 18B through the rod

part material 41. Since the insertion hole 47 for actuators has offset only a from the center of figure of a drum, on the drum body 42, the bending moment which bends the drum body 42 concerned to the opposite side of the clamp slot 44 will occur.
[0033] Also in such a **** 3 operation gestalt, the relational expression of the operation and force, and elastic deformation is the same as said 1st operation gestalt. Moreover, since the same effectiveness as said each operation gestalt can be acquired also with this operation gestalt, and also fine tuning of an electrical potential difference is possible and easy while being able to miniaturize equipment, it can become the same quickly and correctly about the elastic deformation by the piezoelectric device 43 and the elastic deformation of a printing drum in the case of a clamp slot meeting condition. Therefore, generating of vibration of a printing drum is controlled, printing unevenness decreases, and it is effective in the ability to aim at improvement in printing quality.
[0034]
[Effect of the Invention] As explained above, since the elastic-deformation decrement by the contact pressure reduction when resulting in a contact at angle of rotation to which clamp slots meet is made to compensate with a bending moment generating means, according to the shock-mark arrester of the printing machine of the printing machine of this invention, the sum total of the elastic deformation of a printing drum becomes the same as other conditions also in the clamp slot meeting condition. Therefore, since bending of a printing drum is not changed periodically, vibration can be prevented, the printing unevenness resulting from vibration can be prevented, and improvement in printing quality can be aimed at now.

[Translation done.]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

TECHNICAL FIELD

[Field of the Invention] This invention relates to the shock-mark arrester of the printing machine which prevents the shock mark to the printing paper produced at the time of printing of offset printing.

[Translation done.]

* NOTICES *

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PRIOR ART

[Background of the Invention] The lithographic plate or rubber blanket of a metal plate is twisted around printing drums, such as a printing cylinder in the offset press, and a blanket cylinder, at the periphery. And these rubber blankets etc. are being clamped and fixed to the clamp slot in which the edge was formed along with the axis of each drum. Therefore, these clamp slots meet for every rotation at the printing cylinder which has touched mutually, a blanket drum or a blanket drum, and the contact of blanket drums.

[Translation done.]

EFFECT OF THE INVENTION

[Effect of the Invention] As explained above, since the elastic-deformation decrement by the contact pressure reduction when resulting in a contact at angle of rotation to which clamp slots meet is made to compensate with a bending moment generating means, according to the shock-mark arrester of the printing machine of the printing machine of this invention, the sum total of the elastic deformation of a printing drum becomes the same as other conditions also in the clamp slot meeting condition. Therefore, since bending of a printing drum is not changed periodically, vibration can be prevented, the printing unevenness resulting from vibration can be prevented, and improvement in printing quality can be aimed at now.

[Translation done.]

TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] By the way, in the case of printing operation, while each drum presses mutually by the constant pressure, contact rotation is carried out. Therefore, although contact pressure is acting in the condition that a clamp slot is not located during printing at the contact of drums, between the drums which contact, if it results in the condition that a clamp slot meets in a contact, it will be in the condition that the above-mentioned contact pressure falls out. That is, the external force which acts on a printing drum will be changed periodically. Since the radius of the clamp slot of each drum has sunk slightly, it generates, and this contact pressure omission is inevitably produced in offset printing. Therefore, vibration occurs by the shock in case slots meet for every rotation of a printing drum, since this vibration is imprinted by printed matter as a shock mark and makes a pattern that it was printed produce "unevenness", it has a bad influence on the pattern of printed matter, and it becomes the cause of defect printing, and printing quality is reduced.

[0004] Then, although the printing machine (double drum) which enlarged the diameter of a printing drum is also made in order to enlarge the curvature of a shell diameter, to make subduction of the radius of a clamp slot small and to press down vibration low, while increasing the rigidity of a printing drum, there is a problem that manufacture cost becomes high in this case. Moreover, although the method of reducing vibration of each printing drum with an attenuation member or a damper is also proposed, since many frequency components are contained in vibration, it is difficult to always carry out the decay of the vibration effectively to a different print speed. Furthermore, although the printing machine which uses the seamless version and a seamless blanket is also proposed in order to lose the clamp slot of an oscillating generation source, when the manufacturing cost of a version or a blanket becomes high, a blanket shifts gradually to a printing drum as printing advances, and there is a problem that printing quality deteriorates.

[0005] By controlling generating of a periodic vibration of a printing drum, the purpose of this invention decreases printing unevenness and is to offer the shock-mark arrester of the printing machine which can aim at improvement in printing quality now.

[Translation done.]

MEANS

[Means for Solving the Problem] This invention forms the equipment which makes generate the bending moment in the interior of a printing drum, makes the bending moment which generates the elastic deformation equivalent to the elastic deformation of the drum which produces with the contact pressure from which it escaped act on a printing drum according to the period which the periodic omission of the contact pressure in the clamp slots of the drum which is the source of vibration of a printing drum generates, tends to reduce vibration, tends to decrease printing unevenness by this, and tends to plan improvement in printing quality. The shock-mark arrester of the printing machine according to claim 1 concerning this invention specifically The clamp slot for clamping a version plate or a rubber blanket to the axis of the printing drum concerned and parallel, respectively is formed in the front face of two or more printing drums which contact and carry out inverse rotation by predetermined contact pressure. It is the shock-mark arrester of the printing machine which controls fluctuation of the contact pressure produced in case clamp slots meet with rotation of these printing drums. On each printing drum While being prepared in the interior of the printing drum concerned, it is characterized by establishing the bending moment generating means containing push-pull ****** which doubles with the period to which clamp slots meet, and bends these printing drums to the opposite side of a clamp slot.
[0007] It is desirable that it is what has the rigidity which a printing drum calls a printing cylinder, a blanket cylinder, etc. above, and push-pull ****** can deliver the bending moment to a drum body, and it can use the round bar, a square bar, etc. In this case, the expansibility of not only these solid-states but a liquid may be used. Furthermore, as a bending moment generating means, if the opposite side of a slot is made to carry out elastic deformation of the printing drum, what kind of format will be sufficient and an oil pressure controller, a pneumatics type, an electric type, etc. will not be limited. Furthermore, as for the bending moment, it is desirable that it is the strength from which the sum total of the elastic deformation of the printing drum by the bending moment generating means in the case of a clamp slot meeting condition and the elastic deformation by the contact pressure of a printing drum becomes almost the same as that of the elastic deformation by the force which is committed on a printing drum in the case of usual contact conditions other than a clamp slot meeting condition.
[0008] Thus, since elastic deformation of each printing drum is carried out to the opposite side of a clamp slot with a bending moment generating means in case each clamp slot meets, the elastic deformation which decreases by the contact pressure reduced in the contact of clamp slots is compensated with this invention, and it can become the same by it about the elastic deformation by the bending moment generating means and the elastic deformation of a printing drum in the case of a clamp slot meeting condition. Therefore, generating of vibration of a printing drum is controlled, printing unevenness decreases, and improvement in printing quality can be aimed at now.
[0009] The shock-mark arrester of the printing machine of this invention according to claim 2 Each printing drum of a printing machine shock-mark arrester according to claim 1 The drum body which consists of the journal section formed in the drum section which twists a version plate or a rubber blanket, and the both ends of this drum section from the drum section concerned in the minor diameter, It has the bearer which fixed to the both ends of the drum section of this drum body, and is constituted, and push-pull ****** is characterized by being what is bent by hydrostatic pressure while it is prepared in the location which carried out predetermined dimension offset from that axial

center in parallel with the axial center of a drum body.
[0010] As a bending moment generating means to use hydrostatic pressure above, what is depended on an oil pressure controller, a pneumatics type, etc. is mentioned. In this case, the bending moment which supplies to the hole which the force could be made to act on a drum using an oil pressure piston and a pneumatics cylinder, or prepared a pressure oil and the compressed air in the direct drum, and is produced on a drum may be used. In such this invention, the bending moment can be easily generated with easy equipment.
[0011] The shock-mark arrester of the printing machine of this invention according to claim 3 The bending moment generating means of the shock-mark arrester of a printing machine according to claim 2 The oil pressure piston which acts on push-pull ******, and the oil pressure hole formed over the cylinder room where the oil pressure piston has been arranged from the edge of the journal section, The hydraulic pump which supplies a pressure oil to a cylinder room through this oil pressure hole, and the hydraulic line by which the other end is connected to a hydraulic pump while an end is connected to an oil pressure hole through a swivel joint, The hydraulic line by which the other end is connected to a hydraulic pump while an end is connected to an oil pressure hole through a swivel joint, The servo valve which is prepared in the middle of this hydraulic line, and sends out the pressure oil from a hydraulic pump to a cylinder room, It is characterized by having the control unit which was beforehand installed in the pressure oil from a hydraulic pump based on the signal of the detector which detects the location of the clamp slot of a printing drum, and sends that signal, and this detector and which takes out a command to a servo valve so that it may push and may become equal to the force.
[0012] Since a pressure oil which was beforehand installed by the control unit in the opposite side of a clamp slot in such this invention based on the signal of the detector which detects the location of the clamp slot of a printing drum and which pushes and becomes equal to the force can be supplied to an oil pressure piston The elastic deformation reduced by the contact pressure reduced in the contact of clamp slots is compensated, and it can become the same about the elastic deformation by the bending moment generating means and the elastic deformation of a printing drum in the case of a clamp slot meeting condition. Therefore, generating of vibration of a printing drum can be controlled, printing unevenness can decrease, and improvement in printing quality can be aimed at.
[0013] The shock-mark arrester of the printing machine of this invention according to claim 4 Each printing drum of a printing machine shock-mark arrester according to claim 1 or 2 The drum body which consists of the journal section formed in the drum section which twists a version plate or a rubber blanket, and the both ends of this drum section from the drum section concerned in the minor diameter, It has the bearer which fixed to the both ends of the drum section of this drum body, and is constituted. A bending moment generating means In a drum section, to the axial center of a drum body, and parallel And push-pull ****** prepared in the location which carried out predetermined dimension offset from the axial center, The piezoelectric device which acts on this push-pull ******, and the wiring hole formed over the interior of a room where the piezoelectric device has been arranged from the edge of the journal section, The electric wire which a wiring hole lets the other end pass, and extends outside through the slip ring, and supplies the electrical and electric equipment to a piezoelectric device while an end is connected to a piezoelectric device, It is characterized by having the detector which detects the location of the clamp slot of a printing drum, and sends the signal, and the control unit made to generate force which was beforehand set as the piezoelectric device based on the signal of a detector while the end of an electric wire was connected, and which pushes and becomes equal to the force.
[0014] Two or more piezoelectric devices may be used above not only in one piece. In such this invention, since fine tuning of an electrical potential difference is possible and easy while being able to miniaturize equipment, it can become the same quickly and correctly about the elastic deformation by the piezoelectric device and the elastic deformation of a printing drum in the case of a clamp slot meeting condition. Therefore, generating of vibration of a printing drum can be controlled, printing unevenness can decrease, and improvement in printing quality can be aimed at.
[0015]
[Embodiment of the Invention] (The 1st operation gestalt) As shown in drawing 1 and 2, the shock-mark arrester 1 of the printing machine of the 1st operation gestalt of this invention establishes the

bending moment generating means 5 which contains the rod part material 19 grade as the oil pressure piston 11 and a push length member in the printing drum 10, and is constituted. That is, the printing drum 10 is equipped with the drum body 12 and a bearer 13, and is formed, and the drum body 12 has journal section 12B formed in the minor diameter from the drum section 12A concerned to the both ends of drum section 12A and this drum section 12A, and is formed in them.
[0016] The clamp slot 14 is established in drum section 12A, and the end section of the blanket 15 which consists of rubber twisted around the periphery of drum section 12A was rolled round by this clamp slot 14, and has fixed into it. a group which constitutes rotational speed and a printing unit with the driving gear which bearing of the rotation of the drum body 12 is made free by bearing 16, and is not illustrated -- relation is maintained whenever phase [of a drum] equal.
[0017] In such a longitudinal direction of drum section 12A, the hole 17 with a stage parallel to the axial center of the printing drum 10 has ended ranging from the end to the other end. As this hole 17 with a stage is shown also in drawing 2 , it has broken in the clamp slot 14 offset from the axial center of the printing drum 10, and the location which counters, and said oil pressure piston 11 is formed in major diameter 17A as a cylinder room by the side of the end of the hole 17 with a stage. Moreover, the both ends of the hole 17 with a stage are closed by the covering device material 18A and 18B which fixed to drum section 12A. And said rod part material 19 in contact with covering device material 18B by the side of the other end of covering device material 18A of the end section of the oil pressure piston 11 and drum section 12A is inserted in such narrow diameter portion 17B of the hole 17 with a stage.
[0018] Such an oil pressure piston 11 is open for free passage to the swivel joint 20 attached in the end side of the drum body 12 by oil pressure hole 12C formed in the drum body 12. A pressure oil is supplied to this swivel joint 20 by piping 23 via a servo valve 22 from a hydraulic pump 21. Moreover, the dog 24 for detecting the location of the clamp slot 14 on the drum body 12 is formed, and the detector 25 is formed in the frame of a printing machine. And this detector 25 takes out a signal with the timing to which the clamp slot 14 of the printing drums which touch mutually meets in a contact. A control unit 26 will output the command which generates the oil pressure of the pattern with which reduction of the elastic deformation of the drum by the contact pressure from which it escaped set up beforehand is compensated to said servo valve 22, if the signal of a clamp slot meeting is received.
[0019] And in here, said bending moment generating means 5 is constituted including each part material of the continuous sign from the rod part material 19 to the oil pressure piston 11 and a control unit 26.
[0020] Therefore, if the controlled pressure oil is supplied to the major diameter of the hole 17 with a stage via oil pressure hole 12C, the force generated between the oil pressure piston 11 and covering device material 18A will be told to covering device material 18B of the opposite side through the rod part material 19. Since the hole 17 with a stage has offset only a from the center of figure of a drum, on the drum body 12, the bending moment which bends the drum body 12 concerned to the opposite side of the clamp slot 14 will occur.
[0021] Here, the power relationship which acts on a printing drum explains the effectiveness of the shock-mark arrester 1 by this invention. As shown in drawing 2 , in the contact, it is acting on the printing drums 10 and 10A which touch mutually in the direction in which contact pressure W makes one drum 10 desert partner drum 10A. The condition of such elastic deformation is shown in drawing 3 . And the elastic deformation delta 1 of the printing drum in this condition is given by the following formula.
delta1=5*w*L4/(384*E*I)
Young's-modulus [of the field length E:drum ingredient of a contact force L:drum per / which are w:drums here / unit length] I: The second moment of area of a drum section [0022] Contact pressure will be reduced if it results in a contact at angle of rotation to which clamp slot 14 comrades meet. However, with the clamp slot 14 meeting signal by the dog 24 and the detector 25, since the bending moment equivalent to the elastic deformation to which the oil pressure piston 11 decreased since contact pressure decreased is made to act on the printing drum 10, the sum total of the elastic deformation of the printing drum 10 becomes the same as other conditions (non congression condition) also in the meeting condition of the clamp slot 14.

[0023] The condition of the elastic deformation at the time of making the bending moment act on drawing 4 is shown. And the elastic deformation delta 2 of the drum in this condition is given by the following formula.
delta2=a*F*L2/(8*E*I)
Force which the distance F:oil pressure piston of a:oil pressure piston core and the core of a drum body generates here [0024] When clamp slot 14 comrades meet and the contact force per unit length of printing drum 10 comrades deforms into w[from w]', it can ask for the oil pressure p ****** for compensating the elastic deformation by it by the following formula.
delta'=5*(w-w') *L4/(384*E*I)
a*F*L2/(8*E*I)=5*(w-w')*L4/(384*E*I)
F=5*(w-w')*L2/(48*a
p=5*(w-w') *L2/(48*a)/A -- here, according to the amount which the projected net area of A:oil pressure piston, therefore the contact pressure of the printing drum 10 reduce, if the oil pressure p for which it asked by the above-mentioned formula is made to act on the oil pressure piston 11, vibration will be prevented, and the printing unevenness resulting from vibration can be prevented now.
[0025] (The 2nd operation gestalt) As shown in drawing 5 and 6, said 1st operation gestalt makes the shock-mark arrester 2 of the printing machine of the 2nd operation gestalt of this invention a bending moment generating means 6 to make direct oil pressure act on the pressure receiving hole 37 inside the printing drum 30 to preparing what equipped the printing drum 10 with the oil pressure piston 11 grade as a bending moment generating means 5. In addition, in the 3rd operation gestalt stated to a **** 2 operation gestalt and a degree, while giving the same sign to the same structure as said 1st operation gestalt, and a configuration member, the detailed explanation is omitted or simplified.
[0026] In the longitudinal direction of drum section 32A of the drum body 32 in the printing drum 30, the pressure receiving hole 37 parallel to the axial center of the printing drum 30 has ended ranging from the end to the other end. This pressure receiving hole 37 has ended in the clamp slot 34 offset from the axial center of the printing drum 30, and the location which counters while being formed with the diameter of the same. That is, said hole 17 with a stage is replaced. Moreover, while extending along with the axial center of the drum body 32 from the end section of journal section 32B to the middle of the longitudinal direction of the drum body 32, oil pressure hole 32C which ended in the direction of a path from there is connected to this pressure receiving hole 37.
[0027] Therefore, if the controlled pressure oil is supplied to the pressure receiving hole 37 via oil pressure hole 32C, the force which put the pressure at the area of the pressure receiving hole 37 between covering device material 18A fixed to the both ends of the pressure receiving hole 37 and 18B will occur. Since the pressure receiving hole 37 has offset only a from the center of figure of a drum, on the drum body 32, the bending moment which bends the drum body 32 concerned to the opposite side of the clamp slot 34 will occur.
[0028] Also in such a **** 2 operation gestalt, the relational expression of the operation and force, and elastic deformation is the same as said 1st operation gestalt. Moreover, if the same effectiveness as said 1st operation gestalt can be acquired also with this operation gestalt, and also it applies when allowances are in the cross section of the drum body 32, since an oil pressure piston etc. will be made as it is unnecessary, structure becomes easy, thereby, a manufacturing cost can be made cheap and there is an advantage that there is little failure.
[0029] (The 3rd operation gestalt) As shown in drawing 6 and 7, said each operation gestalt makes the shock-mark arrester 3 of the printing machine of the 3rd operation gestalt of this invention a bending moment generating means 7 by which the piezoelectric device was used for the printing drums 10 and 30 to considering as bending moment generating means 5 and 5 by which oil pressure was used.
[0030] That is, in the longitudinal direction of drum section 42A of the drum body 42 in the printing drum 40, the insertion hole 47 for actuators parallel to the axial center of the printing drum 40 has ended ranging from the end to the other end. This insertion hole 47 for actuators has ended in the clamp slot 44 offset from the axial center of the printing drum 40, and the location which counters. That is, said hole 17 with a stage and oil pressure hole 32C are replaced. Moreover, while extending along with the axial center of the drum body 42 from the end section of journal section 42B to the middle of the longitudinal direction of the drum body 42, wiring hole 42C which ended in the

direction of a path from there is connected to this insertion hole 47.
[0031] In the narrow diameter portion of this insertion hole 47 for actuators, the rod part material 41 as a push length member which constitutes a piezoelectric-device actuator is inserted and fixed supported, and one piezoelectric device 43 used as the generation source of the force of the rod part material 41 is formed in the major diameter which is the interior of a room. The electric wire 45 which supplies an electrical potential difference to this piezoelectric device 43 is connected to the slip ring 48 attached in the end face of the drum body 42 through wiring hole 42C prepared in the drum body 42. An electrical potential difference is supplied to this slip ring 48 with an electric wire 45 from a control unit 46. Moreover, if the signal of a clamp slot meeting is received, a control unit 46 will generate the electrical potential difference of the elastic-deformation compensation pattern set up beforehand, and will be outputted to a piezoelectric device 43.
[0032] Therefore, if an electrical potential difference is supplied with an electric wire 45 from a control unit 46, distortion occurs in a piezoelectric device 43, it will be in an expansion condition and the force will be generated between the covering device material 18A and 18B through the rod part material 41. Since the insertion hole 47 for actuators has offset only a from the center of figure of a drum, on the drum body 42, the bending moment which bends the drum body 42 concerned to the opposite side of the clamp slot 44 will occur.
[0033] Also in such a **** 3 operation gestalt, the relational expression of the operation and force, and elastic deformation is the same as said 1st operation gestalt. Moreover, since the same effectiveness as said each operation gestalt can be acquired also with this operation gestalt, and also fine tuning of an electrical potential difference is possible and easy while being able to miniaturize equipment, it can become the same quickly and correctly about the elastic deformation by the piezoelectric device 43 and the elastic deformation of a printing drum in the case of a clamp slot meeting condition. Therefore, generating of vibration of a printing drum is controlled, printing unevenness decreases, and it is effective in the ability to aim at improvement in printing quality.

[Translation done.]

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is drawing of longitudinal section showing the shock-mark arrester of the printing machine of the 1st operation gestalt concerning this invention.
[Drawing 2] It is drawing showing the A-A cross section of drawing 1 .
[Drawing 3] It is drawing showing the force concerning the printing drum under printing of this operation gestalt, and the condition of elastic deformation.
[Drawing 4] It is drawing showing the condition of the elastic deformation at the time of making the bending moment act on the printing drum of this operation gestalt.
[Drawing 5] It is drawing of longitudinal section showing the shock-mark arrester of the printing machine of the 2nd operation gestalt concerning this invention.
[Drawing 6] It is drawing of longitudinal section showing the shock-mark arrester of the printing machine of the 3rd operation gestalt concerning this invention.
[Drawing 7] It is drawing showing the C-C cross section of drawing 6 .
[Description of Notations]
1, 2, 3 Shock-mark arrester of a printing machine
5 Seven Bending moment generating means
10 Printing Drum
11 Oil Pressure Piston Which Constitutes Bending Moment Generating Means
12 Drum Body
12A Drum section
12B Journal section
12C Oil pressure hole
14 Clamp Slot
19 Rod Part Material Which Constitutes Push Length Member
21 Hydraulic Pump
25 Detector
26 Control Unit
37 Pressure Receiving Hole
43 Piezoelectric Device
45 Electric Wire
46 Control Unit

[Translation done.]

* NOTICES *

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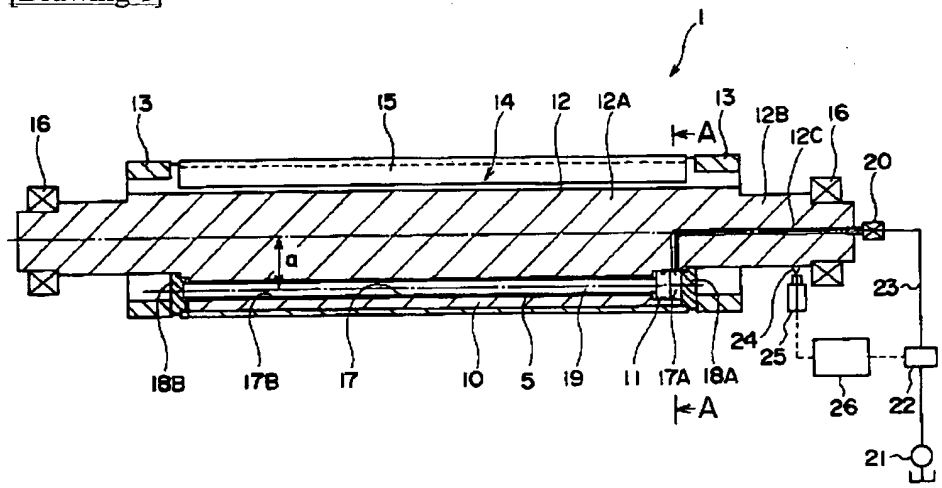
damages caused by the use of this translation.

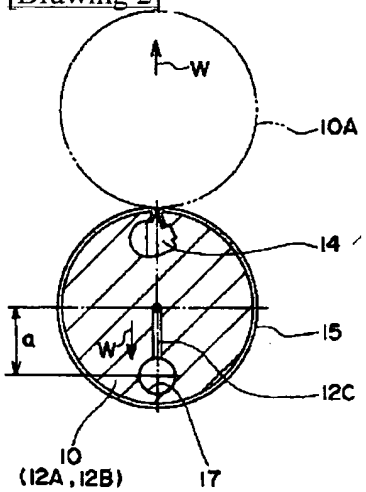
1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DRAWINGS

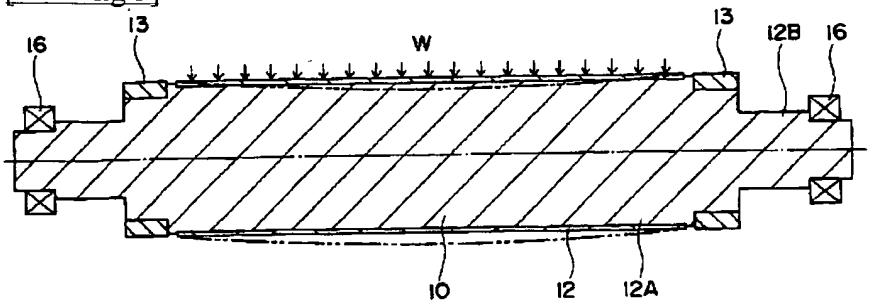
[Drawing 1]



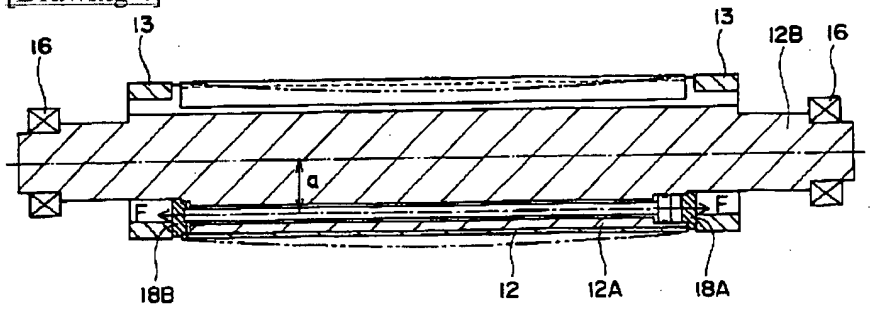
[Drawing 2]



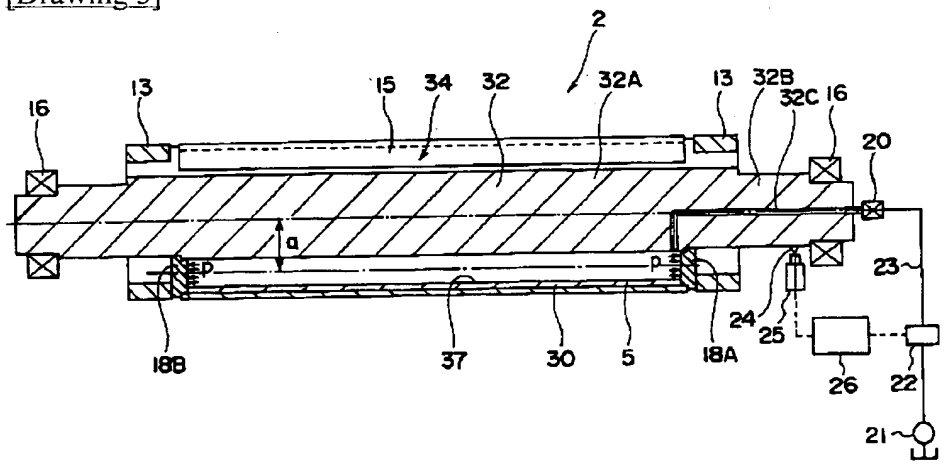
[Drawing 3]



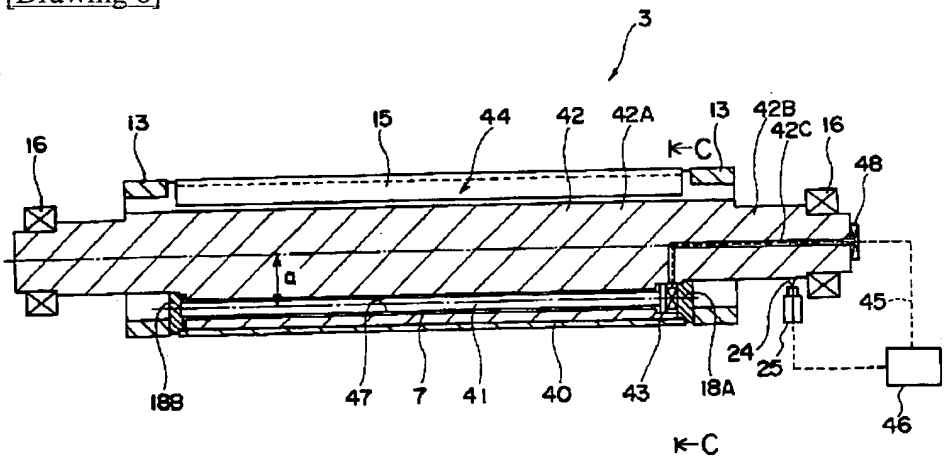
[Drawing 4]



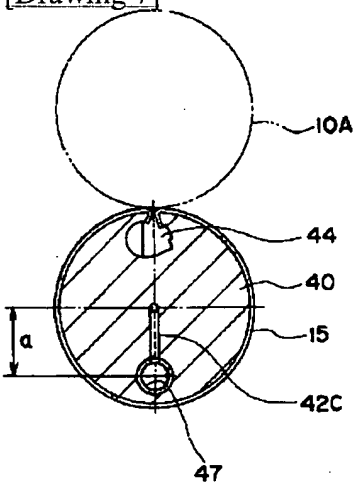
[Drawing 5]



[Drawing 6]



[Drawing 7]



[Translation done.]